DOCUMENT RESUME

ED 335 061 IR 053 785

AUTHOR Eisenberg, Michael B.; And Others
TITLE Trends & Issues in Library & Information Science 1990.
INSTITUTION ERIC Clearinghouse on Information Resources, Syracuse, N.Y.
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
REPORT NO IR-89; ISBN-0-937597-30-9
PUB DATE 90
CONTRACT RI88062008
NOTE 75p.; For the 1988 edition, see ED 314 099.
AVAILABLE FROM Information Resources Publications, 030 Huntington Hall, Syracuse University, Syracuse, NY 13244-2340 (IR-89; $7.50 plus $2.00 shipping and handling).
PUB TYPE Information Analyses - ERIC Clearinghouse Products (071)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Content Analysis; Elementary Secondary Education; Futures (of Society); Higher Education; Information Science; Learning Resources Centers; *Library Administration; *Library Education; *Library Research; Library Role; *Library Services; Optical Data Disks; *Technological Advancement; Trend Analysis

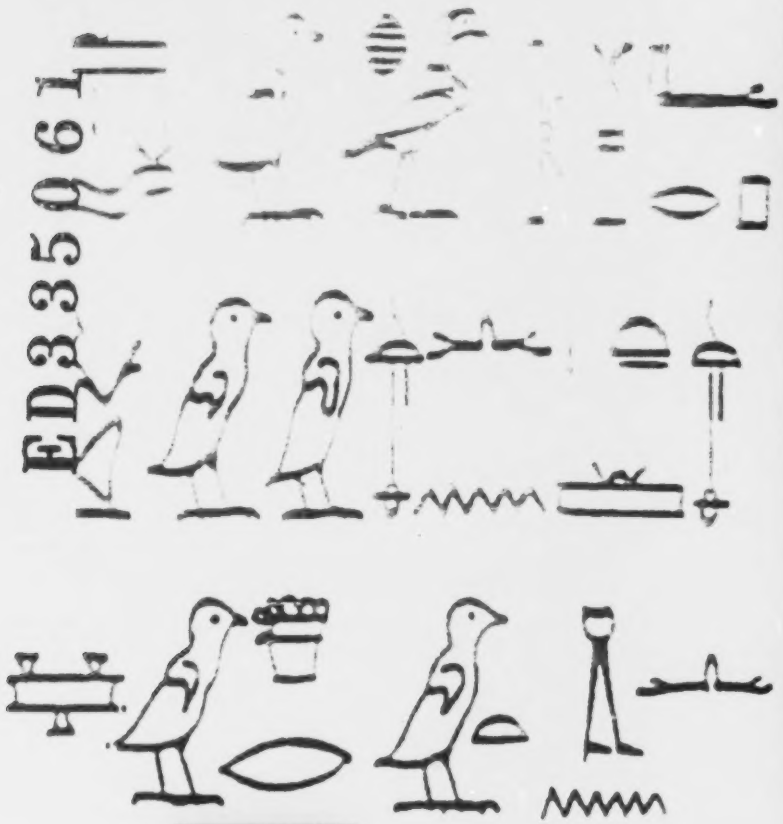
ABSTRACT

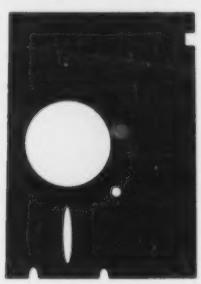
This synthesis paper provides a state-of-the-art analysis of the field of library and information science based on the results of a content analysis of its literature, including selected journals, conference proceedings, dissertations, and ERIC input. The 14 trends and issues identified by the analysis include developments in technology, management, services, professional education, research and the field. The following trends are discussed: (1) the demand for and provision of end-user access to computer-based information resources; (2) the increase of networks and telecommunications in libraries; (3) the continued growth of CD-ROM technology; (4) the focus on collection management activities by libraries; (5) output-oriented planning and evaluation processes in libraries; (6) libraries' concern with reaching new user groups; (7) literacy promotion; (8) information literacy promotion; (9) the expanded roles and responsibilities of library and information professionals; (10) continuing professional education opportunities; (11) bibliometrics; (12) new research involving artificial intelligence; (13) the continuing challenges to intellectual freedom and to intellectual property rights; and (14) the impact "Information Power: Guidelines for Library Media Programs," a 1988 joint publication of the American Association of School Librarians and the Association for Educational Communications and Technology. (MAB)

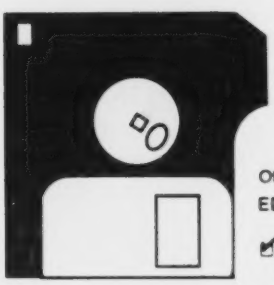
****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

TRENDS & ISSUES IN LIBRARY & INFORMATION SCIENCE 1990

ED335961







IR053785

ERIC

CLEARINGHOUSE ON INFORMATION RESOURCES

SYRACUSE UNIVERSITY

1990

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

IR-89

TRENDS & ISSUES IN LIBRARY & INFORMATION SCIENCE 1990

Michael B. Eisenberg
Kathleen L. Spitzer
Ilana Kingsley
Christine Darby

ERIC
CLEARINGHOUSE
ON INFORMATION
RESOURCES

SYRACUSE
UNIVERSITY
1990

IR-89

This publication is available from Information Resources Publications, Syracuse University, 030 Huntington Hall, Syracuse, NY 13244-2340 (IR-89; $7.50 plus $2.00 shipping and handling).

Michael B. Eisenberg is an Associate Professor at the School of Information Studies, Syracuse University, and the Director of the ERIC Clearinghouse on Information Resources.

Kathleen L. Spitzer is a recent graduate of the Master's of Library Science program at the School of Information Studies, Syracuse University.

Ilana Kingsley and Christine Darby are candidates in the Master's of Library Science program at the School of Information Studies, Syracuse University.

ISBN: 0937597-30-9

This publication was prepared with funding from the Office of Educational Research and Improvement, U.S. Department of Education, under contract no. RI88062008. The opinions expressed in this report do not necessarily reflect the positions or policies of OERI or ED.

Table of Contents

Introduction 1

General Comments On Approach 3

General Comments On Findings 7

Technical Developments 9

Management 10

Services 10

Specific Trends and Issues 12

Technical Developments 12

TREND #1: There is increasing demand for and provision of end-user access to computer-based information resources. 12

TREND #2: Libraries of all types are increasing their use of networks and telecommunications. 15

TREND #3: Growth in computer-based information sources continues to revolve around CD-ROM technology. 19

Management And Planning 21

TREND #4: There is an increasing focus on collection management activities to enable libraries to better meet the

general goals of institutions as well as the specific needs of users. 21

TREND #5: Output-oriented planning and evaluation processes are being implemented to ensure responsive library and information programs. 23

Services 25

TREND #6: Beyond maintenance of existing services, libraries are increasingly concerned with reaching out to new user groups. 25

TREND #7: Consistent with national interests, libraries are focusing on the promotion of literacy 28

TREND #8: The promotion of information literacy is becoming a concern for all librarians. 29

Personnel 32

TREND #9: Technology is changing the roles and responsibilities of information professionals and support staff. 32

TREND #10: Library school is not enough: professional education should continue throughout the librarian's career. 33

Research 35

TREND #11: Consistent with the 1988 *Trends and Issues* study, bibliometrics continues to receive major research interest. 35

TREND #12:
There is continued effort to apply techniques of artificial intelligence to improve computer-based information systems. 36

The Field 39

TREND #13: Challenges to intellectual freedom and to intellectual property rights continue. 40

TREND #14: The 1988 publication of *Information Power: Guidelines for Library Media Programs* continues to have far-reaching effects on the school library media field. 42

Bibliography 45

Appendix A: Content Analysis Methodology Used in This Study 56

Purpose 56

Content Analysis: Some Background 57

Content Analysis in This Study 58

Conceptual Categories into Operational Definitions 59

Content Source Units 60

Data Collection Procedures 61

Limitations to the Study 63

Strengths of the Study 63

Recommendations for the Future 64

References 64

Appendix B 66

Appendix C 67

Introduction

This monograph is the second of a biennial effort by the ERIC Clearinghouse on Information Resources to determine, document, and describe the pervasive trends and issues in the field of library and information science. It is the companion piece to the *Trends and Issues in Educational Technology* monograph also published by the Information Resources Clearinghouse (Ely, 1989). Together, these two works provide insights for educators, researchers, and decision makers into areas of current interest as well as an indication of some likely future developments in the educational technology and information fields.

The scope of this monograph is confined to considering the trends and issues in library and information science that relate to education at all levels. As such, it encompasses a substantial range of interests, from censorship and intellectual freedom to resource sharing and cooperative collection development, to the convergence of technologies in all library settings.

As in previous publications, a "trend" is defined as a cumulative indicator of activities and/or products, with some indication of movement and direction. A trend is identified through such questions as: "What are the major concerns in the field? Where are professionals and researchers concentrating their efforts? What are the new developments, and where are they likely to lead?" As trends develop, "issues" emerge. Issues are defined as problems, concerns, and questions for which there are two or more points of view. The emphasis here is on major trends as well as key issues related to particular trends.

The process of identifying the trends and issues described in this monograph involved a systematic content review of the literature of the field, including:

- journals,
- conference proceedings,
- input into the ERIC document collection (RIE), and
- dissertations.

Specific content sources are listed in Figure 1.

Figure 1. Content Sources

Journals

College & Research Libraries
School Library Media Quarterly
The Journal of the American Society for Information Science
Library Trends

Dissertation Sources

University of California at Berkeley
University of California at Los Angeles
University of Illinois at Urbana-Champaign
Indiana University
University of North Carolina at Chapel Hill

Conferences

American Library Association
The American Society for Information Science

ERIC Input

Documents and articles in the area of Library and Information Science put into the ERIC system from October 1, 1988 to September 30, 1990.

Yearbook

The ALA Yearbook of Library and Information Services '90. "Background for the Nineties."

The reviewers analyzed a total of 800 items, compared with 568 in the 1988 analysis. For most sources, the reviewers analyzed an abstracted representation of the item (e.g., ERIC and dissertation abstracts, descriptions of conference workshops, and presentations). Even when the full text of an item was available (e.g., for journals and conference proceedings), the reviewers still relied most heavily on abstracts and summaries, turning to the full text only to resolve questions or ambiguities.

As noted in the earlier monograph, a limitation of using a literature-based approach to identify current trends and issues is the problem of timeliness. There is often a considerable time delay between the writing and the actual publication of a document, calling into question how "current" the material actually is. In an effort to overcome the timeliness problem, the literature analyzed included conference proceedings and input to the ERIC database, two sources with a relatively short time span between writing and publication.

The exact methodology for the literature survey drew from the techniques of content analysis as well as Naisbitt's approach to uncovering "megatrends" (Naisbitt, 1982). The complete methodology is explained in Appendix A.

GENERAL COMMENTS ON APPROACH

The instrument used to conduct the analysis (i.e., to record the topical emphasis of an article, paper, or conference session) reflects the same format as the 1988 version with a few alterations in subtopics. The broad topical headings were:

- the field,
- personnel,
- management,
- technical developments,
- instructional processes,
- services, and
- research/theory.

TOPICS	Journals	Confs	RIE	Dissts	Total	Percent
MANAGEMENT	30	68	78	2	178	22%
General	3	12	4	0	19	2%
Organization	0	0	1	0	1	0%
Logistics/Operations	5	4	6	0	15	2%
Procedures/Policies	1	0	5	0	6	1%
Facilities	1	3	3	0	7	1%
Finance/Budget	3	8	5	0	16	2%
Planning Processes	2	5	18	2	27	3%
Collection Management	11	23	20	0	54	7%
Preservation	0	8	14	0	22	3%
Personnel	4	5	2	0	11	1%
TECHNOLOGICAL DEV.	32	50	65	8	155	19%
General	2	2	4	0	8	1%
Computer-Related (Hard/Soft	2	13	14	4	33	4%
Computer-Based Info Sources	18	16	24	1	59	7%
Telecomm./Networks	2	8	14	0	24	3%
Video	0	0	0	0	0	0%
Audio	0	0	0	0	0	0%
Photography	0	0	0	0	0	0%
Interactive Media	1	0	0	0	1	0%
Hypermedia	1	4	1	0	6	1%
Artifical Intelligence	6	7	8	3	24	3%
THE FIELD	12	41	66	1	120	15%
General	0	5	5	0	10	1%
History	1	0	0	0	1	0%
State of	6	14	29	0	49	6%
Future	0	6	8	0	14	2%
Ethics	1	6	2	0	9	1%
Legal Aspects	4	8	18	1	31	4%
The Standards	0	2	4	0	6	1%

PERSONNEL	**26**	**23**	**35**	**4**	**88**	11%
General	4	8	2	0	14	2%
Roles/Responsibilities	10	2	12	2	26	3%
Recognition	3	0	0	0	3	0%
Certification	1	0	0	0	1	0%
Leadership	2	1	1	0	4	1%
Professional Education	4	11	18	2	35	4%
Status	2	1	2	0	5	1%
SERVICES	**16**	**45**	**94**	**2**	**157**	20%
General	0	14	5	0	19	2%
Literature/Reading Guidance	1	8	10	0	19	2%
Resources (Curr) Support	1	3	16	0	20	3%
Skills Instruction	5	3	33	1	42	5%
Information Services	9	17	30	1	57	7%
INSTRUCTIONAL PROCESSES	**0**	**1**	**8**	**0**	**9**	1%
General	0	0	0	0	0	0%
Distance Education	0	0	4	0	4	1%
Problem Solving	0	1	0	0	1	0%
Evaluation	0	0	0	0	0	0%
Design and Development	0	0	4	0	4	1%
RESEARCH/THEORY	**43**	**31**	**10**	**9**	**93**	12%
General	32	12	7	6	57	7%
IR research	11	19	3	3	36	5%
TOTAL	**159**	**259**	**356**	**26**	**800**	

Figure 2: Summary of Findings

More specific subtopics were listed under each of these.

As the analysis was being conducted, the reviewers found that some changes in subtopics were indicated. Alterations in subtopics from the previous analysis included:

- redefining the "computer-related" subtopic by dividing it into three sections: computer-based information sources, computer-related (hardware/software), and artificial intelligence;
- creating two new subtopics under management: personnel and preservation;
- changing "status" to "state of" under the topic of the field; and
- including two subtopics under the research/theory topic: general and information retrieval research.

These alterations reflect the evolving concerns of the field and permit a rough quantification of the emphasis given to each area in the literature. Figure 2 presents a summary of findings for each of the sources analyzed. The areas are listed from high to low, i.e., those broad topics receiving the most attention (management, services, technical developments) are listed first; those receiving minimal attention (instructional processes, research/theory) are listed last. Figure 3 notes the rank order of the broad topics for this study in comparison to the 1988 study.

Figure 3. Rank Order of Content Analysis Categories

	1990	1988
Management	1	1.5
Services	2	3
Technical Developments	3	1.5
The Field	4	5
Research/Theory	5	6
Personnel	6	4
Instructional Processes	7	7

GENERAL COMMENTS ON FINDINGS

The common and overriding "megatrend," which is present in every broad category and subtopic, is concern for the impact of technology. The 1988 *Trends and Issues* study reported that "developments in processing power, software, and storage have the potential to affect every aspect of information management and services." We are now seeing that potential translated into actuality. The library world is in the midst of a technological restructuring. Every facet of library work—services, management, collection development, facilities, personnel—is changing because of new technological capabilities. For example:

- All types of libraries—academic, public, school, special—are offering direct access to online databases through CD-ROM, dial-up, and/or a local mainframe computer system.
- Traditional instruction in library use is being replaced by instruction in database selection, query formulation, Boolean logic, and other skills associated with the use of computer-based information systems.
- Technology, initially used to automate manual management processes, eventually dictates changes in the nature of the processes themselves. Local and wide area networks are expanding the concept of the library "collection" in two ways: (1) by providing users with remote access to the *local* collection, thereby expanding availability beyond the physical site; and (2) by providing local users access to *remote* collections, thereby increasing the size of the collection.
- Existing facilities are being retrofitted and new facilities are being designed to accommodate the needs of computers and telecommunications.
- Technology is causing a shift in professional and staff responsibilities (e.g., bibliographic access, collection development, public service, instruction).

Most forecasters agree that these changes represent only the initial, short-term impact of technology on libraries. While

these technological innovations are altering the specific ways in which library professionals and staffs conduct business from both a management and a service perspective, the reality and perception of what a library "is" and "does" remain essentially unaltered. That is, the purpose of any library or library program is still to meet the information needs of users.

However, those who speculate beyond the short-term are beginning to envision a fundamentally different notion of "library"—one that is not tied to any specific physical environment or even local constituent population. These prognosticators refer to the "virtual library" or "library without walls"—coordinated collections of local, regional, national, and international information resources, available in a variety of electronic and print formats, and accessible by all users through information superhighways. The hallmarks of the virtual library will be availability and flexibility. It will make no difference where, how, when, or why people use the virtual library—at home, at school, or in an office; at a desk or on a lap; in the boardroom or the classroom; for learning, entertainment, work, or play.

Despite these radical changes, the primary role of the librarian in relation to the virtual library does not change. Librarians must still actively strive to meet the information needs of users. In the electronic, virtual library environment, it becomes even *more* necessary for librarians to serve as intermediaries "bridging the gap between information and people" (Irving, 1988, p. 13). In addition to professionals with abilities to apply management and information-seeking skills to completely new contexts, the virtual library requires

> professionals with expertise in a variety of formats, machines, technologies, research techniques, teaching techniques. . . [It also requires]. . . a cadre of technical librarians [who]. . . work in artificial intelligence, the design of access systems, data-base refinements, networking, information industry relations, and standards development. (Segal, 1990, p. 63)

These speculations are at once exciting and intimidating. It will be interesting to track developments and discussions related to the virtual library over the next few years.

The other "megatrend" worth noting, also present in the 1988 *Trends and Issues* study, is a constant focus on the user and the impact of specific developments on the user. As was previously stated, the purpose of any library or library program is to meet the information needs of users. However, while this "user focus" may have been present in the standards and charters of many libraries and organizations, the literature and day-to-day operations of libraries did not always emphasize this focus. This is no longer the case. Whether the topic is collections, staff, budget, or facilities, there is a clear emphasis on the implications in terms of users. The literature on technology focuses on end-user interaction, user-friendly systems and features, and the development of systems that meet a range of user interests. Writings on planning and management are concerned with output measures and how library operations contribute to user services. Specific services are discussed in terms of influence on diverse user groups.

These two dominant megatrends—the influence of technology and the concern with users—have increased and intensified since the 1988 *Trends and Issues* study.

The top three topics in 1988—technical developments, management, and services—continue to receive the most attention. These three areas represent 61% of all of the articles, papers, and presentations studied (see Figure 2). This carry-over in trends is not surprising. As Ely (1989, p. iii) notes, "Year-to-year trends are not as variable as decade-to-decade trends. The fact that certain trends are repeated, is, in a sense, a confirmation of their importance. Confidence is increased as a trend appears over several years." Some of these enduring trends and issues include:

Technical Developments

- The documented popularity, demand, and expansion of CD-ROM capabilities.
- The improvement of computer-based information sources due to improved computing, user interfaces, storage capacity, multimedia options, and the application of natural language and other techniques associated with artificial intelligence.

Management

- The adoption by many libraries of systematic planning processes and evaluation measures that focus on outputs.
- Collection management issues related to the preservation and needs of rare collections, the management of special collections, and the need to develop collections that are responsive to users' needs.
- The management of automation activities, including retrospective conversion and system implementation.

Services

- A growth in services to various groups (e.g., minorities, young adults, immigrants, elderly people) while maintaining in-place services.
- An emphasis on information skills instruction that encompasses far more than locating and accessing materials in the library.
- A further involvement with the national interest in literacy.

There are also some noteworthy differences in this year's content analysis. The provision of services and access through telecommunications (by using networks, telephone, facsimile, broadcasting, and other technologies) is an important emerging area. Such developments as the proposed National Research and Education Network (NREN) lead the way to the virtual library discussed above.

Another emerging concern is available funding for services and technology. These expanded services to users rely on both technology and professional intervention and come at a cost. In addition, there was a major increase in the coverage of research and theory (from 4% in 1988 to 12% in 1990) and less material concerning personnel (17% in 1988, down to 11% in 1990). This decrease primarily reflects a 5% drop in the professional education category.

Interestingly, the major commonalities and differences between 1988 and 1990 are also reflected in the companion *Trends and Issues* studies conducted for educational technology (Ely *et al.*, 1988, 1989). For example, Ely *et al.* reported a continuing focus on technological developments and

products and their use. They also found a major increasing interest in telecommunications and research and a decrease in personnel concerns (again, particularly professional education). These similarities between the studies of the two fields provide further evidence to support the trends reported here.

The remainder of this publication expands on the specific trends and issues uncovered. The discussions, while based in the literature studied, are supplemented with material from additional sources. As in 1988, the explanations are not exhaustive. The intention is to provide insight into current concerns and note anticipated developments worth tracking.

Specific Trends and Issues

TECHNICAL DEVELOPMENTS

TREND #1: There is increasing demand for and provision of end-user access to computer-based information resources.

Two phrases that frequently appear in library and information science literature in recent years are "end-user" and "user-friendly." Both words reflect a concern for facilitating access to computer-based information systems. Marshall (1990) notes that the trend toward end-user searching is becoming more prominent due to a "general social trend towards self-service in the economy, which includes everything from selfservice gas stations to automated bank teller machines" (p. 56). As end-user searching becomes more prevalent, there is a focus on (1) systems design for ease of use, and (2) instructional efforts to facilitate end-user searching.

At the present time, most computer based information systems are accessed through their own set of unique commands. For example, truncation in one system might be noted by using an asterisk, in another by using a question mark, and in still another by using a pound sign. As a result, the end user is confronted with the confusing task of memorizing commands for each database. Menu driven systems, which seek to rectify this situation, do not offer much relief because they, too, are often confusing.

Puttapithakporn (1990) makes several suggestions for the improvement of online systems. Menu systems can be im-

proved by including adequate descriptions of menu items, arranging menus to match users' expectations, and eliminating the requirement for users to use abbreviations (e.g., *brws* instead of *browse*) for commands. Suggestions for improvements to online assistance include the provision of query-in-depth help and context sensitive help, error, and prompting messages to inform users when they have made a syntactic error, and online tutorials that reflect users' needs and allow for more than straight line navigation.

Online searchers in the Southern California Online Users' Group (SCOUG), whose members use online sources regularly, go beyond Puttapithakporn's suggestions for improvement. SCOUG suggests:

- the development of a common command language for all databases to eliminate the current variety of commands for searching, displaying, printing, and logging off;
- the provision of an option to a common command language in the form of a front end to interpret the different commands native to various systems;
- a means to customize commands by specifying command characteristics (e.g., *=wildcard character);
- the availability of detailed database descriptions online rather than just in print format;
- the ability to eliminate duplicate citations when searching multiple databases;
- a means to access the full text of a cited source whether or not it resides in the database being searched. (Basch, 1990)

While these suggestions are those of professional searchers, they would benefit all end users. Developments such as hypermedia interfaces and the inclusion of graphic interfaces should also facilitate end user searching.

The question of whether end users can conduct successful and satisfactory searches is often raised. A survey conducted at Vanderbilt University examined several aspects of end-user searching, including the status and prior experience of end-users, their purpose for using CD-ROM, the means by which end-users learned how to search, the

frequency and ease of use of particular databases, their satisfaction with results, and their suggestions for improvement of databases (Steffey & Meyer, 1989). The survey found that end-users were generally satisfied with the number and value of citations retrieved.

Another study, designed to examine the differences between menu driven, native command, and mediated searches, was undertaken by Sullivan, Borgman and Wippern (1990). This study found that:

> regardless of the two training methods used [Native Command or Menu Driven], end-users were just as satisfied with their retrievals as the Mediated Controls were with the retrievals of trained librarians. Moreover, the end-users' retrievals were smaller and more precise, and end-users indicated that they would be more likely to follow them up by consultation of the references listed. (p. 38)

The authors note that "the most important difference between the Menu and Native Command groups was that learning and searching under command mode promotes more interaction with the database" (p. 39). Although menu driven searching is often promoted as being easier for end-users, the study found that for users accessing Sci-Mate, there was no evidence that searching was easier with the menu system as opposed to the native command language. The authors indicate a need for future study of the quality of retrieval by those using native command language versus menu systems.

Regardless of the availability of menu systems, the current state of technology is such that it is almost impossible for end-users to approach a computer-based information source and immediately begin to use it successfully. End-users need instruction in transferable skills such as "database structure, Boolean logic, the use of function keys . . . and help screens" (Johnson & Rosen, 1990, p. 38). There are a variety of ways to carry out instruction, e.g., workshops, online tutorials, workbooks, flip charts, manuals. However, a survey designed by Allen (1990) shows that the method of instruction that users most prefer is individual instruction and the least preferred methods are lectures and workbooks. The survey also shows that,

while librarians perceive that users need instruction in vocabulary control and database selection, this need is not perceived by users. Allen suggests that librarians must create an awareness of the necessity for these instructional components.

The need to design online instruction in consideration of users' diverse experiential backgrounds is described by Huston (1989). The design of the online instruction program at Evergreen State College (Olympia, Washington) is based on the results of a survey of novice adult searchers. The resulting instructional program builds on familiar experiences with communications systems such as automated banking machines to increase users' knowledge of electronic databases.

The focus of online instruction in school library media programs is on curriculum-integrated instruction. Epler (1989) discusses several such programs being conducted throughout the United States. For example, the online searching instruction program at Tower Hill School (Wilmington, Delaware), which was developed and designed by the faculty and the school library media specialist, is fully integrated with the curriculum and provides students with access to DIALOG through the CLASSMATE program.

TREND #2: Libraries of all types are increasing their use of networks and telecommunications.

Enhancing access to information through network participation is a priority reflected in much of the literature. Such participation allows libraries to (1) share human and material resources (thereby saving time and money), (2) improve collection management through collaboration, and (3) increase interaction with others to share decision making (Immroth, 1984).

Telecommunications, broadly defined as communication over a distance, includes communication by telephone, telegraph, telefacsimile, radio and television broadcasting, and computer systems (Rosenberg, 1984, p. 531). Libraries are implementing both wide area networks (WANs) and local area networks (LANs) to improve services and

management. WANs (e.g., WLN, RLIN) typically use telecommunications to link geographically distant organizations, whereas LANs connect computers and peripherals within one location of an organization. Implemented through cabling, additional hardware, and software, LANs allow users to share expensive peripherals, transfer files across different types of computers, and communicate via electronic messaging systems. A recent development in networking is the ability to network CD-ROMs. Through a LAN, users can access information on CD-ROMs from within the library, from elsewhere within an organization, or off-site via modem. (See Trend #3 for a more detailed discussion of CD-ROM networks.) This type of access is making the concept of the "virtual library," or "library without walls," a reality.

The provision of network access is generating a demand for prompt delivery of information. Upon retrieving relevant bibliographic citations, users desire access to cited sources through interlibrary loan. Telefacsimile (fax) is becoming an increasingly popular means of transmitting interlibrary loan (ILL) requests and materials. This technology improves delivery speed because ILL requests are often sent via telefacsimile directly to an institution owning a source rather than being sent via mail to an intermediary clearinghouse and then forwarded. According to the 1990 *ALA Yearbook*, "There were major increases in the number of digital telefacsimile installations in libraries in 1989. Libraries installed at least 1,000 new units during the year—nearly double that in 1988" (Boss, p. 133). An expanding demand for access to remote collections coupled with decreasing prices of telefacsimile equipment will, no doubt, promote a continuation of this trend.

Networks are often planned and implemented on a state level. A survey of every state in the United States conducted by the Merrimack (Massachusetts) Education Center "found that approximately 60% of the states now operate a statewide computer or telecommunications network" (Lavin & Phillipo, 1990, p. 69). The literature includes many examples of statewide networks.

The Illinois Library and Information Network (ILLINET), a multitype network involving the participation of 2,488 libraries (1,122 school, 634 public, 558 special, and 174

academic libraries), provides enhanced information services to the citizens of Illinois (Swisher *et al.*, 1991). In describing the various components of ILLINET, Smith (1990) states that "the sum of networking in Illinois is the compilation of a number of components. Ready access to varied collections, the Intersystem Library Delivery Service, ILLINET Online, the telefacsimile network—all are integral parts of the larger whole of ILLINET" (p. 84).

New York is in the process of planning a statewide network such that all types of libraries in the state will "become 'electronic doorways' through which all New Yorkers can reach the totality of information resources of the State" (Statewide Automation Committee, 1989, p. 1). A statewide planning document sums up the importance of networks:

> The metaphors of the past that have described the broad and complex objectives of libraries—storehouses of knowledge, learning centers, windows on the world, poor man's universities—share a common theme—access to ideas and information. The Electronic Doorway Library can be a signal of commitment to use the astonishing capability of technology to overcome distance and time to deliver the totality of the State's information resources. The promise of the Electronic Doorway Library minimizes the inequities of library size and site to offer equal information access to every resident of New York State—a goal for the year 2000. (Statewide Automation Committee, 1989, p. 11)

On a national level, librarians are concerned about the role of libraries in the proposed National Research and Education Network (NREN). This concern is evidenced by the focus on NREN both in networking and telecommunications sessions at the 109th Annual Conference of the American Library Association (1990) and in many journal articles. Legislation proposing NREN, the National High-Performance Computing Act of 1990 (S. 1067), was introduced by Senator Albert Gore but failed to be passed by the 101st Congress. The legislation, which will likely be reintroduced by Sen. Gore, proposes the creation of a "high-capacity electronic highway of interconnected networks linking business, industry, government, and the education

and library communities" (Parkhurst, 1990, p. ix). This web of networks would provide extensive access to a range of services, such as electronic bulletin boards, electronic mail, file transfer, online library catalogs and databases, commercial and governmental information services, and specialized applications and databases (Bishop, 1990).

NREN is an important element in the effort to provide widespread access to electronic resources and services. Again, the culminating conceptualization is that of the virtual, electronic library. However, before that vision can become reality, a number of issues related to national networking must be addressed. These include:

- costs and fees,
- equal and open access,
- user training and support,
- management and use policies,
- quality control of information resources, and
- the relationship of network services to existing patterns of research and educational information communication, access, and use. (Bishop, 1990)

Librarians and other information professionals are just beginning to consider their roles and responsibilities in light of NREN and related developments. For example,

- How can libraries use NREN to improve existing services?
- What new services can libraries provide that enhance the effectiveness and use of NREN?
- What can librarians do to ensure that all citizens have equal access to all forms of information?

TREND #3: Growth in computer-based information sources continues to revolve around CD-ROM technology.

The *1988 Trends and Issues Study* reported that CD-ROM had emerged as a major technology for providing computer-based access to information. The current literature confirms that CD-ROM is the desired storage medium for local access to electronic information. Factors contributing to the popularity of CD-ROM are the decreasing production costs and the relative ease and low cost of adapting existing hardware platforms to make use of CD-ROM. Beyond bibliographic databases, electronic resources now available on CD-ROM include online catalogs, full-text reference and periodical sources, and numerical databases.

Issues associated with CD-ROM include timeliness, database availability, and multiuser access. Telecommunications access and networking appear to be viable solutions to all three of these concerns. The first two concerns can be dealt with through using a combination of CD-ROM and dial-up online services. The multiuser issue can be addressed through a local area network that allows sharing of CD-ROMs by many users.

Clearly, information available on CD-ROM systems is not as current as that provided by dial-up online information services. The frequency of CD-ROM updates can range from a month to a year or more. There is also a growing recognition that a single information system is inadequate to meet public information needs. For example, if a library provides access to a local CD-ROM for a highly used database (e.g., a general periodical index), two problems arise: (1) not all desired journals are covered by the index, and (2) some patrons need more up-to-date coverage than that offered by the CD-ROM. By providing access to CD-ROM *and* dial-up online services, it is possible to meet both of these needs (Charles & Clark, 1990).

Most libraries that implement stand-alone CD-ROM stations for popular databases quickly find that demand far outstrips the availability. Recent developments in networking hardware and software make it possible to group CD-

ROM drives in a "tower" and provide access to a given CD-ROM through a local area network (LAN).

The configuration of a CD-ROM network typically consists of an optical server running CD-ROM networking software connected to numerous CD-ROM drives shared across a LAN (Rutherford, 1990). CD-ROM drives may be contained within tower units that are designed to hold multiple internal CD-ROM drives. Additional drive capability can be extended with expansion hardware that links towers together. According to Buerger (1989), the number of users and linked CDs are limited only by the hardware and software in place. That is, additional servers, drives, towers, wiring, and software can be installed to greatly increase the overall system capacity.

All types of libraries are implementing CD-ROM networking. Grant and Stalker (1989) describe the implementation of a CD-ROM network that was developed in two phases at O'Neill Library at Boston College. The first phase, Multi-Platter 1, involved four workstations that could access four CD-ROM drives. However, since the library owned more than four CD-ROM databases, librarians had to remove and insert additional CD-ROM discs throughout the day. This inconvenience, along with the observation that students had to sign up days in advance to search popular databases, prompted the O'Neill Library staff to seek a better solution. The chosen configuration includes two CD-ROM tower units networked to ten workstations in the library. Improved access to the databases has elicited positive reactions from users, and the library plans to expand the network to include six additional CD-ROM drives.

School library media programs are providing access to CD-ROM networks both within the library media center and beyond. Quince Orchard High School (Maryland), built in 1988, has in excess of 270 computers, located in five computer labs, in each classroom, and in administrative, guidance, and department offices. The network provides access to such CD-ROM resources as *Magazine Index Plus, DIALOG OnDisc Medline, Microsoft Bookshelf,* and the *New Grolier Electronic Encyclopedia* to every computer in the school. In addition, telecommunications allow access to library media resources even when the library media center is closed. The school is now conducting a pilot project to

provide telecommunications access to its resources to other schools within the county (Judd, 1990).

CD-ROM systems and use also receive considerable research attention. Allen (1990) points to numerous research projects aimed at determining how to improve CD-ROM systems. From the user perspective, appropriateness of the chosen database and formulation of the search-query appear to be among the most critical issues. Research about database selection and frequency of use aid the library in providing appropriate CD-ROM services.

MANAGEMENT AND PLANNING

TREND #4: There is an increasing focus on collection management activities to enable libraries to better meet the general goals of institutions as well as the specific needs of users.

There are three prominent issues in the literature related to collection management: (1) concerns about the needs and uses of rare collections and archives; (2) specific strategies for developing and managing collections; and (3) the need for library and information professionals to work more closely with users, particularly faculty in academic and school settings, in the selection of materials. All of these issues center on a move toward systematic, user-oriented collection planning.

The first issue focuses on physical space, preservation, and financial problems as major concerns of libraries with special collections, rare books, and archives. Libraries holding special collections need to re-evaluate the use of these resources, particularly with regard to user needs. An assessment and evaluation of collection usage should help to determine whether the collection correlates with the institution's academic goals and discover whether building and maintaining the collection is in the users' best interests. Auchstetter (1990) suggests that

> institutions. . . unable to support financially a proper rare book collection or whose academic goals do not emphasize original research [might choose to] per-

> severe through the establishment of cooperative collection development and resource sharing programs, [or] discontinue their attempts at rare book collecting. . . and. . . develop special collections that will reflect their educational interests and goals. (p. 228)

Concerned with guidelines and plans for collection management, the second issue is the focus of numerous manuals and workshops. Manuals have been generated for different types of collections, such as school library media centers, special research libraries, mountaineering libraries, and church libraries. They have also been published as references to help other information professionals develop and manage their collections. These manuals confront issues of user needs and surveys, selection and weeding processes, physical space problems, financing, maintenance, preservation, future needs, and the general management of the collection. Besides published manuals, various workshops and seminars geared toward collection management have been offered at major conferences. The array of workshops includes many different types of collections, such as maps, microforms, electronic libraries, books, and nonprint materials.

A third issue in collection planning involves the need for librarians to form working liaisons with faculty members to systematically develop responsive collections. This idea has widespread support in school library media centers, where librarians act as consultants to classroom teachers on the use of information and resources in instruction. According to the national guidelines, "Library media specialists are responsible for working with teachers to ensure that the resources selected meet the specific goals and objectives of the curriculum and interests of the students and staff" (*Information Power*, 1988, p .28). By working closely with teachers, library media specialists gain sufficient knowledge of the curriculum to manage their collections and offer information that may be integrated with content area instruction. Faculty/librarian liaisons are also common in academic libraries. In his manual for the College of the Southwest, Tubesing (1989) discusses the need for academic librarians to be knowledgeable not only about the collection, but also about college and course needs. Academic librarians must be directly involved with faculty to provide

library users with access to relevant, up-to-date information for their coursework.

TREND #5
Output-oriented planning and evaluation processes are being implemented to ensure responsive library and information programs.

Two recurring issues depicted in the literature, as well as in conferences and workshops, are strategic planning and output measures for evaluating library and information programs. Strategic planning and output measures are closely related; both are needed to plan, organize, and implement an effective and efficient library and information program. Use of output measures precedes strategic planning, since assessment through output and performance measures must be undertaken before a strategic plan can be adequately developed.

Planning and evaluation processes play an integral role in the information field. Hernon and McClure (1990) offer an excellent definition and explanation of the need for evaluating library and information programs:

> Evaluation, which is the accountability aspect of planning, represents a measurement of effectiveness or efficiency in reaching some predetermined goal. Evaluation is an essential component for any organization wanting to modify its goals and objectives, establish priorities, and allocate resources in such a manner that the various programs and activities can be accomplished effectively and efficiently. (p. xv)

Output or performance measures use both qualitative and quantitative means to evaluate the use of collections, reference services, equipment and facilities, and other functions of the library and information program. Their purpose is to answer the question, "How well is the library doing what it claims to be doing?" (Hernon & McClure, 1990, p. 138). Evaluation methods are inherent in the operation of functional and meaningful library and information programs. Van House (1989) confirms that:

> Output measures and other kinds of performance measures in libraries have been an exciting and valuable trend. The continued development of these measures, and their growing use. . . promises to improve the understanding and management of library services. (p. 277)

While output measures provide a reliable means of assessing the actual performance level of a library, strategic planning "provides a foundation for making choices about future library decisions" (Eisenberg *et al.*, 1988, p. 8). The purpose of a strategic plan is to thoroughly assess the present system and prepare for future changes. Forsman (1990) states that strategic planning commonly consists of seven sequential steps whereby the organization:

1. identifies its internal value and belief systems,
2. assesses environmental factors,
3. writes a concise mission statement,
4. creates program strategies that state goals and timeframes,
5. reviews past and present performance,
6. scrutinizes its ability to achieve the plan, and
7. develops contingency plans. (p. 150)

According to Forsman, step one, the determination of organizational values, is particularly important for libraries in that the internal value system is the ultimate determinant of outcomes. Forsman also suggests that a comprehensive assessment of the values of the organization is needed in order to develop a strategic plan that is in concert with these value systems.

SERVICES

TREND #6: Beyond maintenance of existing services, libraries are increasingly concerned with reaching out to new user groups.

An increasing emphasis on library services is consistent with the user and output orientations described above. Maintaining existing levels of services, while adding new ones, requires library and information professionals to be keenly aware of the general needs of users; the specific needs of particular groups (e.g., minorities, immigrants, young adults, and people who are elderly, disabled, or disadvantaged); the levels and impact of use resulting from any given service; and the cost of services in terms of staff, resources, facilities, and technology.

In considering the current debate about special services to address the needs of an increasingly diverse population, Kirtz (1991) cites some startling statistics:

- Of those who will be eighteen years old in the year 2000, almost one-quarter presently live below the poverty level.
- In some urban areas today, almost 50% of the students fail to finish high school, and a disproportionate number of these are from minority groups.

Equally revealing are U.S. Bureau of Census (1991) figures:

- While the total U.S. population increased 9.8% between 1980 and 1990, the Asian and Pacific Island population increased 107.8%, American Indians, Eskimos, and Aleuts increased 37.9%, and the Hispanic population increased 53.0%.
- The percent of the U.S. population 60 years and over is projected to grow by 8.9% between 1989 and 2000, and by 26.8% between 2000 and 2010.

Libraries are responding to changing demographics by expanding and targeting services to new audiences. For example, Kirtz (1991) describes a public library community outreach program, "Let's Talk about It," that seeks to widen reading horizons and enhance cultural literacy for

out-of-school adults. Through the cooperative efforts of librarians, the American Library Association, state humanities councils, and local groups, this program has spread across the country from its point of origin in Vermont (p. 3).

Craver (1991) describes expanded library programs to immigrant children and their families. She points out the nature of the immigrant experience and how librarians can serve as a bridge between society and immigrant children and their families (p. 125). For example, Denver Public Library, Queens Borough (New York) Public Library, and others are attempting to meet the needs of these users through expanded collections, rotating collections of foreign language books and periodicals, English-language instruction (through audiocassettes, computer-assisted, and traditional methods), career counseling, and programs that celebrate other cultures.

"Latchkey children," defined by the Public Library Association's (PLA) Services to Children Committee as school-aged youth who have no parent or guardian at home or alternative care arrangement, are another group who are turning to the library for services. Many of these children wind up in the public library after school and at other times when school is closed and parents are working because:

- they like libraries and library materials,
- libraries can help with homework or recreational needs,
- they would rather go to the library than be at home alone, or
- they have been told to use the library by parents or guardians. (Services to Children Committee, 1988)

Some libraries have focused on the legal, philosophical, and economic problems related to latch-key children's use of the library; others have used this as an opportunity to expand youth services through such activities as film showings, book discussion groups, and homework assistance programs (Dowd, 1989).

Hales-Mabry (1990) notes a changing attitude towards services to older adults as well. Her research confirms the prior research evidence of weak or nonexistent services to

aging populations. However, in 1987 the Library Service to an Aging Population Committee of the American Library Association's Reference and Adult Services Division (RASD) published "Guidelines for Library Service to Older Adults." Included among the eleven guidelines are statements that promote:

- a positive attitude toward the aging process and older adults,
- information and resources on aging and its implications,
- library services appropriate to the special needs of all older adults (including the geographically isolated, homebound, institutionalized, or disabled),
- incorporating the changing needs of an aging population as part of the library's planning and evaluation process. (Hales-Mabry, 1990, p. 70-75)

While these guidelines alone do not ensure adequate services to older adults, they do indicate an increasing awareness of the need for libraries to focus on the needs of this previously neglected segment of society.

When libraries seek to expand services, the question of cost and financing for services is always a major issue. Martin (1989) notes that "the finite reality of our buildings, our budgets, and our staffs forces us to limit our collections and our services at a time when information and access to it are gaining importance in our society." He questions whether it is possible to fulfill the goal of providing the highest level of service as exposed in the first tenet of the ALA Code of Ethics. "In the light of the ethics and ideals of our profession, can we draw the line? Where will libraries find funds to provide such services?" (p. 20-21).

Closely tied to the issue of cost is the issue of equity. Those who have the need for services are often those who can least afford to pay. Yet, faced with the costs of online searching, many public and academic libraries find it necessary to institute fees for these and allied services, which are shared or fully paid by the user (Wall *et al.*, 1990, p. 272). In a major paper on equity of access to technology in schools, Neuman (1990) notes that "history does not suggest that equitable access to, and use of, the newest technologies will

happen automatically or even easily" (p. 158). Recent economic conditions and decreases in government funding will strain the ability of libraries to provide equitable services.

TREND #7: Consistent with national interests, libraries are focusing on the promotion of literacy.

Libraries are implementing programs to promote literacy using a variety of strategies such as intergenerational tutoring, outreach programs to day care centers, and programs to promote reading. However, library involvement may be as simple as providing a quiet space for students and their literacy volunteer tutors to meet.

On April 25, 1990, "Night of a Thousand Stars," a nationwide publicity event focused on literacy and lifelong learning, was initiated by the American Association of School Librarians and coordinated by the American Library Association. On this date, school and public libraries throughout the country participated by arranging appearances by local and national celebrities to encourage reading. For example, in Los Angeles such notables as Kirk Douglas, Charlton Heston, Beau Bridges, Shana Alexander, Jayne Kennedy, and Leo Buscaglia all contributed their time to the effort. The successful program was repeated during National Library Week in 1991.

Dickman (1990) suggests that a literacy information and referral service is one means of providing support for literacy. He also suggests that a literacy coalition be formed so that efforts will not be duplicated. For example, the Ohio Literacy Network, formed to share information and training, publishes a quarterly newsletter to update readers on current activities, state and federal legislation, resources and publications, and upcoming events (Dickman, 1990).

One of the National Goals for Education adopted by President Bush and the governors of each of the states in 1989 states that, "By the year 2000 every adult will possess the skills and knowledge necessary to compete in a global economy and to exercise the rights and responsibilities of citizenship." This goal prompted the formation of the first national literacy forum, "Strengthening the Literacy Net-

work," which met in May 1989 to discuss recommendations to the 1991 White House Conference on Library and Information Services. Those recommendations include:

- the incorporation of the concept of the library as an educational agency into existing legislation;
- the development of a strategy for more stable funding for literacy;
- the continuation of the improvement of evaluation, research, and dissemination of library-based literacy efforts by libraries and other literacy providers;
- the redirection of administrative responsibilities for LSCA titles related to literacy directly to the state library agency. (Quezada, 1990, p. 24)

Libraries are focusing on family literacy to emphasize the importance of modeling reading behavior, having books available in the home, and providing à rich language environment from birth (Talan, 1990). The California State Library's Families for Literacy (FFL) Program is one such project. FFL provides books for ownership, meetings to introduce families to the resources and services of libraries, and storytelling for families. It also promotes reading aloud to children. Two national organizations that promote family literacy are the Barbara Bush Foundation for Family Literacy and the National Center for Family Literacy. Both provide training and assistance to those developing family literacy programs.

TREND #8: The promotion of information literacy is becoming a concern for all librarians.

Although the phrase "information literacy" was first used by Zurkowski in 1974 at a National Commission on Libraries and Information Science hearing, the movement to promote information literacy has only recently gathered momentum. Part of that momentum has come from the 1989 *Final Report of the American Library Association Presidential Committee on Information Literacy,* which focuses on the impact of the Information Age and the need to educate our citizens to be information literate. The report notes that:

> To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. (p. 1)

The final report was widely disseminated and a National Forum on Information Literacy was convened on November 16, 1989, in Washington, DC. The Forum, whose participants included representatives from a variety of nonlibrary organizations, resulted from the Presidential Committee's report, which stated that "the major obstacle to promoting information literacy is a lack of public awareness of the problem created by information illiteracy" (p. 11). Developed by a number of educational and governmental agencies, the charge to the Forum states that:

> The National Forum on Information Literacy is to focus national attention on the importance of information literacy to individuals, to the economy and to citizenship. It is to develop public awareness and support for the role of education in the development of information literate people. (cited in Breivik, 1990)

Patricia Senn Breivik, chair of the ALA Presidential Committee, has written extensively on the subject (Breivik & Wedgeworth, 1988; Breivik & Shaw, 1989; Breivik, 1989). Breivik's (1989) monograph, *Information Literacy*, coauthored by E. Gordon Gee, President of the University of Colorado, focuses on academia and calls for learning to be structured around information resources to promote problem-solving and the evaluation of information. Rather than traditional isolated bibliographic instruction, this approach requires course-integrated instructional efforts in accessing, evaluating, and using information. Ormondroyd (1988) observes that more academic librarians are developing course-integrated instruction. She notes that although course-integrated instruction requires additional course development time, such instruction is more effective because instructional efforts are tied to real needs. Additional evidence of the trend toward course-integrated instruction is found in *The Reference Librarian* (Pastine & Katz, 1989), which devotes an entire issue containing over twenty articles to the topic.

School library media specialists also continue to promote information literacy through integrating information skills instruction into the curriculum. Such integration is recommended by *Information Power*, the national guidelines for school library media programs. The publication of *Information Power* has encouraged states to review and reformulate state guidelines to recommend curriculum integration (e.g., *Wisconsin Department of Public Instruction Matrix for Curriculum Planning in Library Media and Information Skills Education*, 1989).

Several monographs and articles aimed at the school library media audience share the view that information skills are a prerequisite to becoming information literate, and that information skills are necessary survival skills in the information age. Examples include:

- *Brainstorms and Blueprints: Teaching Library Research as a Thinking Process* (Stripling & Pitts, 1988).
- *Learning and Information: Skills for the Secondary Classroom and Library Media Program* (Cutlip, 1988).
- *Information Search Process: A Summary of Research and Implications for School Library Media Programs* (Kuhlthau, 1989b.)
- *The Information Search Process of High-, Middle-, and Low-Achieving High School Seniors* (Kuhlthau, 1989a)
- *Curriculum Initiative: An Agenda and Strategy for Library Media Programs* (Eisenberg & Berkowitz, 1988).
- *Information Problem-Solving: The Big Six Skills Approach to Library and Information Skills Instruction* (Eisenberg & Berkowitz, 1990).

As is common to most other areas of the library field, the proliferation of technology is also affecting instruction. The effects of technology on instruction are discussed in Trend #1.

PERSONNEL

TREND #9: Technology is changing the roles and responsibilities of information professionals and support staff.

As technology permeates library and information programs, the roles and responsibilities of information professionals and support staff are expanding and changing. Changes in librarians and paraprofessionals' jobs include "work flow, policies, procedures, assignments, and working relationships" (Dewey, 1989, p. 50.) Many of these changes call for all staff to break from traditional passive attitudes and move to proactive practices. The entire library staff can play an active role in determining user and community needs, requesting financial support, and planning to take advantage of new systems and technologies (Huang, 1989).

In academic libraries, professional librarians are assuming more responsibility for managing, supervising, meeting with faculty, and, more recently, instructing both staff and users on the operation of computerized systems (Kreitz & Ogden, 1990, p. 304-308). In terms of management activities, this includes making administrative decisions about computer-based information systems, user workstations and interfaces, local area networks and connections beyond the immediate environment, and automation of technical services. Professionals must also consider how to use facilities, staff, appropriations, and other resources in light of technological developments. For example, using professional staff to plan, select, establish, manage, and monitor a program of end user access to online databases may be more cost and service effective than providing full-time professional assistance at the reference desk.

At the same time, some paraprofessional responsibilities have blurred with those of professional duties. Kreitz and Ogden (1990) confirm that "these blurred areas may well point to a general shifting of certain tasks from professional to paraprofessional levels of responsibility" (p. 310). Shifting and overlapping roles and responsibilities include bibliographic access and some areas of collection development, reference, and public service. When they analyzed the

University of California libraries, Kreitz and Ogden found that public service duties, once a traditional role of the MLS librarian, are now equally shared by paraprofessionals; that is, as many assistant librarians answer complex reference questions (65%) as do librarians holding MLS degrees (64%) (1990, p. 304).

TREND #10: Library school is not enough: professional education should continue throughout the librarian's career.

Several concerns exist relating to professional education and continuous staff development for library and information professionals. Such concerns include (1) the need for training related to new technologies, (2) the need for libraries to offer more in-house training sessions, and (3) the need for librarians to be educated to serve an international clientele.

Freeman and Clement (1989) argue that the provision of training for library staff is a critical issue in planning for library automation, and that it should be taken into consideration early in the process of selecting the new system. Staff should be introduced to the potentials of the new system for facilitating various functions even before it is installed to raise their level of expectations and encourage them to accept the changes in procedures and workflow that automation will bring. They identify four issues as being critical to the success of staff training: timing, modularity, location and trainers. They advise proceeding slowly for the benefit of slower and/or reluctant learners, and following introductory training with training for each new module as it is installed. They also point out that it is important to pay attention to who is doing the training for each staff level, and that training should focus on practical, on-the-job applications.

Freeman and Clement (1989) also stress the necessity for ongoing staff training to keep personnel up to date on software enhancements, new system modules, and changes in library policies, as well as training for new staff members.

Library managers are increasingly interested in providing staff development opportunities on site, rather than attending formal courses at professional schools or sessions at workshops and conferences. Weaver-Meyers (1990) promotes local training because:

> What is taught [at workshops and conferences] is not always implemented in the workplace. . . because it is not seen as relevant to the attendee's current duties. . . [Furthermore,] the problem is exacerbated by the institution's assumption that such programming represents an adequate staff-development program. (p. 253)

Temple University instituted a "peer coaching" approach to helping reference librarians improve and update their skills. According to Arthur (1990), "The coaching experience provide[s]. . . the opportunity for polishing communication skills and reinforcing positive desk behaviors" (p. 372). Librarians work in a collegial atmosphere, choosing their own coaches. This promotes openness and confidence; librarians work with each other without feeling threatened by a supervisor or a manager.

Technology has brought about a burgeoning international information environment. The interdependence of the international marketplace indicates a need for professionals to be versed on a global level. Brogan states that:

> In order to be effective, academic librarians must understand the new international marketplace. Even local problems, such as preservation, database development, and cataloging standards, must be considered in their international context. (1990, p. 200)

RESEARCH

TREND #11: Consistent with the 1988 *Trends and Issues* study, bibliometrics continues to receive major research interest.

Bibliometrics involves "the use of statistical methods to analyze a body of literature to reveal the historical development of subject fields and patterns of authorship, publication, and use" (Young, 1983, p.22). Citation analysis and author co-citation analysis are two examples of bibliometric methods. Bookstein (1990), a frequent contributor to this field of study, confirms a resurgence of interest in bibliometrics. He provides as evidence the formation of the journal *Scientometrics* and the initiation, in 1988, of an international conference series on the subject.

While some research efforts are devoted to purely theoretical explorations, there is discussion of the applicability of bibliometric research. Rousseau (1990) lists a range of recent applications, noting that "Bibliometric (or informetric) research has developed a rich body of theoretical knowledge, which in turn aims at finding wider applications in all practical aspects of information work" (p.197). Such applications are useful for researchers as well as practitioners.

A special section of the July 1990 issue of the *Journal of the American Society for Information Science* (JASIS) is devoted to author co-citation analysis (ACA). Bayer *et al.* and McCain, whose articles appear in this section, describe computer-generated mapping techniques to display the results of ACA. Such techniques provide researchers and scholars with a means of investigating relationships among authors and schools of thought within disciplines.

Devin and Kellogg (1990) use information from existing bibliometric studies to develop a table of percentages of serial use within subject areas. They propose that research libraries divide their budgets between serials and monographs by using these established ratios. Citation analysis is also one of several dimensions in Sievert's (1990) comparison of *Online* and *Online Review*. These studies demonstrate ways in which bibliometrics may be useful in

collection management and provide support for the decision-making process, functions which have assumed new importance in light of the current budget crisis brought on by the rising price of serials.

Terminology within the field itself seems to be an issue. Bookstein (1990) relates an impression that the terms "bibliometrics" and "scientometrics" are being replaced in the literature by the term "informetrics" to imply a wider range of applicability. It remains to be seen if this is, in fact, the case.

TREND #12: There is continued effort to apply techniques of artificial intelligence to improve computer-based information systems.

Efforts to improve information systems are increasingly focusing on research associated with artificial intelligence. Two major areas of artificial intelligence research are natural-language processing and expert systems.

Natural-language processing involves computer understanding and use of common human languages. The ambiguous nature of language makes natural-language processing a difficult task; recent developments, however, are encouraging. In an introduction to a special issue of *Information Processing and Management* that was devoted to natural-language processing, Smeaton (1990) notes that researchers believe that current natural-language techniques are now applicable to information retrieval processes and systems.

One major avenue of natural-language research involves interpreting text through the use of linguistic constructs, e.g., nominal compounds (Gay & Croft, 1990); anaphoric references (Liddy, 1990); conjunctions and ellipses (Metzler, Haas, Cosic, & Weise, 1990). Focusing on logic and meaning, knowledge-based research also relates to natural-language processing.

Ford (1991) reports that one of the major uses of knowledge-based intelligence in information retrieval systems is to improve the user interfaces to traditional systems. Many of

the improvements pertain to allowing end-user interaction through natural language. Ford describes systems (e.g., CANSEARCH, a front-end system to MEDLINE, and PLEXUS, an expert referral system) that employ a range of linguistic and logic techniques to permit natural-language interaction and the reformulation of natural-language requests into statements that traditional systems can use.

In addition to user interfaces, natural-language processing techniques are being applied to the automatic generation of indexes, index terms, abstracts, and other text. Salton, Buckley and Smith (1990) report on efforts to generate back-of-the-book indexes. Paice (1990) and Liddy (1987) have studied the problem of creating abstracts automatically, and Alberico (1990) predicts that natural language research will go beyond automatic text generation and lead to machine translation of texts.

Expert systems are knowledge-based systems that attempt to solve problems and provide answers required by users in a wide variety of situations. Alberico (1990) states that this line of research offers "the area of greatest promise for applied artificial intelligence" (p.71). By taking advantage of the categorized knowledge of experts in a particular domain, expert systems should reduce drudgery in repetitive tasks and improve performance (Davies, 1987). However, these systems are designed to enhance users' decision-making capabilities, not replace them (What is an expert system, 1989).

Since the performance of expert systems ultimately depends upon the effective use of knowledge and problem-solving techniques provided by well-trained experts, much of the research in this area focuses on the knowledge base. Here, theories and techniques of linguistics and logic are used to model and store data, information, and knowledge in ways that better match human conceptual understandings in order to facilitate retrieval. For example, Bruandet (1989) outlines a domain knowledge model for the automatic construction of a knowledge base.

Developmental expert systems span a variety of functions in a wide range of domains, including weather prediction, medical diagnosis, software debugging, and battlefield control (Fenly & Harris, 1988). Appropriate domains for the application of expert systems in libraries include organiz-

ing sources for a particular subject, tracking financial information, managing vendor files for use in collection development, and providing decision support for interlibrary loan (Carrington, 1990).

In the future it may be possible to use expert decision-support systems to aid in answering reference questions. In fact, Richardson (1989), in proposing a research agenda for developing such systems, notes that "it is not only possible but desirable to build [such] an expert system" (p. 232).

Alberico (1990) notes certain trends that will facilitate the development of information systems based on artificial intelligence (AI). In terms of hardware, he highlights:

- **Embedded systems:** AI capabilities previously accomplished with software will be embedded in hardware.
- **Downward migration:** AI technology will move from minicomputers and specialized workstations to desktop and laptop personal computers.
- **Parallel processing:** This approach to computer processing involves separate processors working together (in parallel) instead of a single large processor handling problems (in sequence).
- **Computer chips:** Rapid increases in capacity and capabilities will continue.

In terms of combined software/hardware research he notes:

- **Neural networks:** This interdisciplinary research seeks to simulate the biological processes of neural links in the human brain (sometimes referred to as distributed parallel processing).
- **Machine learning:** Efforts are being made to develop experimental systems that are able to analyze inputs, recognize patterns, and use this information in some way.
- **User modeling:** Systems store user profiles and use that information to customize human-computer interaction.

- **Distributed systems:** Different systems are linked to share computing power, processor capabilities, data, services, and knowledge.

From all of the above, we can predict some of the promising uses for artificial intelligence in library and information work:

- Intelligent front-ends to online catalogs, bibliographic, full-text, and expert databases;
- Intelligent tutoring systems for instruction and training;
- Local expert question and answer systems;
- Distributed expert systems—available through networks;
- Adaptive, graphic (and audio) user interfaces that adjust themselves to the style and needs of users;
- Electronic browsing through local and remote databases, using hypermedia and other capabilities;
- Intelligent library systems that integrate local and remote indexing tools, bibliographic databases, full-text, expert systems.

THE FIELD

Many of the trends—the implementation of information retrieval technology to expand access to collections, the provision of additional services to address the needs of specific groups while maintaining existing services, the integration of technology into management functions, and the concern for developing an information literate population—are positive indicators of the state of the library and information field. Of course, not all of the trends are positive. Areas of concern include (1) freedom of access to information, and (2) the means by which improvements will be financed. Addressing these issues and seeking the means to initiate improvements are critically important for the continuation of positive growth. Of course, these improvements should not be achieved at the expense of those areas that are already contributing to sound programs which serve library users well.

TREND #13: Challenges to intellectual freedom and to intellectual property rights continue.

Entwined with the concerns for intellectual freedom and intellectual property rights are legal and ethical issues. These issues often overlap and pose a major concern both for those in the field of information and for society as a whole. Intellectual freedom concerns not only one's right to access information, but also issues relating to what is to be controlled, under what circumstances, and for what purpose.

The librarian's primary role is to facilitate access to the information that library patrons seek. Censorship, by definition, has as its purpose a directly contradictory goal—to deprive readers of access to materials they seek. Therefore, the issue of intellectual freedom necessarily lies at the crux of any censorship battle.

In response to the impassioned controversy surrounding Salman Rushdie's *The Satanic Verses*, the library community joined forces with booksellers to protest the Muslim death threat against the author, who now lives in hiding. Similarly, the American Library Association's Freedom to Read Foundation, the American Booksellers Association, and the Magazine Publishers' Association combined their efforts to challenge a section of the federal obscenity law requiring publishers to maintain records of the names, ages, and addresses of models who pose for depictions of sexual activities. This section, along with one authorizing the seizure of material deemed to contain child pornography—even material not yet declared illegal—was ultimately struck down by Judge George H. Revercomb as unconstitutional. In one of the most unusual cases of intellectual freedom, the father of a nine-year-old schoolboy objected to the inclusion of Dr. Seuss's *The Lorax* on a second-grade required-reading list and took out a full-page advertisement in the local weekly newspaper to promulgate his views (Cheatham, 1989, p. 30).

In many regions of the country, those who seek to censor their children's reading are gaining a greater degree of control over what materials are available through their

libraries. In Saginaw County, Michigan, for example, where there is an active chapter of the American Family Association (a religious group formerly called the National Federation for Decency), Jim Davis's cartoon book, *Garfield: His Nine Lives*, was moved from the children's section of the public library to the adult collection because of one of its cartoons. Additional complaints in that county have forced the library's review committee to continually reassess other children's and young-adult books (Cheatham, 1989, p. 30).

Parents in Gwinnett County, Georgia, have found a different way to restrict their children's access to "objectionable" material. A dual card system prohibits youngsters from checking out dictionaries as well as various categories of materials that might contain adult themes; these categories include science, fiction, and adult. Judith Krug, director of the ALA's Office for Intellectual Freedom, criticized the system, saying, "Children have rights also, and we believe the dual card system limits the young person's ability to select the information and ideas they're interested in" (Cheatham, 1989, p. 30). Hopkins (1990) notes that these differing outcomes to censorship challenges seem to indicate a void in research that needs to be addressed.

Copyright protection has also become a central issue in the literature. Intellectual property laws reserve certain rights to those who capture the expression of their ideas in print, electronic, video, audio, or some other tangible format; once the expression of the idea is committed to such a storage medium, the right to change, interpret, copy, or otherwise use that expression becomes the exclusive right of the author (*A guide to intellectual property protection*, 1988). Unfortunately, technological developments are making the copyright laws increasingly ineffective in protecting authors' rights, and piracy of intellectual property has grown dramatically. The International Piracy Project (Hoffman, 1990) defines piracy as: "The unauthorized taking of another person's intellectual property through substantial duplication or production of a substantially similar product or information for commercial purposes" (p. 9). Authors and other copyright owners are likely to be reluctant to share their work through computer networks unless mechanisms for intellectual protection exist.

Since many copyright infringement cases ultimately lead to court, all information personnel must be aware of the issues and maintain a balance between the competing principles of authors' intellectual property rights and users' "fair use" rights.

Other ethical issues are also beginning to receive considerable attention. Ethics, values, and norms are usually seen as affective, rather than cognitive, in nature, and efforts to integrate them into both the educational and the informational processes may be one step in addressing concerns that continue to arise. A session of the Special Interest Group on Technology, Information, and Society (SIG/TIS) at the 1989 annual meeting of the American Society for Information Science (ASIS) featured three papers focusing on ethical issues: (1) Frankel (1989) reported on problems in professional ethics including scientific fraud, conflict of interest, and the responsibility associated with the sharing of research data; (2) Flood (1989) discussed ethical values and norms and their place in instructional settings; and (3) Barnes (1989) discussed the appropriateness of the current ASIS Code of Ethics.

TREND #14: The 1988 publication of *Information Power: Guidelines for Library Media Programs* continues to have far-reaching effects on the school library media field.

Information Power, a joint publication of the American Association of School Librarians (AASL) and the Association for Educational Communications and Technology (AECT), presents recommended guidelines for school library media programs. The document proposes five challenges and advances a three-fold role for school library media specialists: information specialist, teacher, and instructional consultant. The 1988 *Trends and Issues* study notes that, although *Information Power* had been presented to educators at all levels, discussions of the publication were just beginning to appear in the literature. Since then, *Information Power* has engendered numerous workshops, presentations, publications, and discussions, as well as revisions of both certification requirements and

scope and sequence documents. The national guidelines were the topic of four workshops and three pre-conferences at the 1989 Annual AASL Conference at Salt Lake City, Utah. Articles written on the subject include Royal's (1989) discussion of how the focus of professional education must change to meet the suggested guidelines; Perritt's (1988) update on the effects of the guidelines on the recommendation that the master's degree be considered the entry-level degree on certification requirements; Stripling's (1989) article, which poses numerous questions for each of the five challenges presented; and Kulleseid's (1989) discussion of the necessity for cooperative collection development to support integration with the curriculum.

The role of the library media specialist as an instructional consultant is a point of much discussion. Challenge number four of *Information Power* states that the library media specialist should "provide leadership, instruction, and consulting assistance in the use of instructional and information technology and the use of sound instructional design principles" (p. 10-11). Writing in *School Library Media Annual*, which presents an exploration of the topic, Craver (1990) notes that although many school library media specialists have embraced the role of instructional consultant, the *instructional design* aspect of the role has not yet been fully accepted and implemented.

Curtis (1990) emphasizes the importance of the role, stating that "school library media specialists of the new decade are experts not only in techniques for organizing and managing information but in matching methods and delivery systems for that information in order to facilitate learning both within their library media programs and within the total educational organization" (p. 62). She enumerates six responsibilities of library media specialists as instructional consultants: (1) **advisor:** to provide expertise in the adoption of new technologies; (2) **change agent:** to act as "catalysts for change. . . through their knowledge of and competence in a wide range of learning technologies"; (3) **designer:** to combine knowledge of curricular goals with sound instructional design principles to design instruction; (4) **instructor:** to provide instruction in the use of new technologies; (5) **producer:** to use knowledge of media production to "provide advice and assistance to teachers and

students to produce customized materials, tailor-made to specific instructional or learning needs and situations"; and (6) **evaluator:** to "provide guidance to teachers in the selection and evaluation of appropriate instructional technologies" (pp. 63-64). Turner and Zsiray (1989) note that the role has engendered a great deal of emotion. Based on an analysis of past research on the instructional consultant role, they suggest that future studies be designed to (1) document the amount and level of instructional consultation in current practice, and (2) study the effects of instructional consultation on learning and attitudes. Writing in the "Make Your Point" column for *School Library Journal*, Barron (1990) observes that there was some discussion at the 1990 ALA Annual Convention in Chicago of revising *Information Power*. He states that the intention of *Information Power* was to base guidelines on research rather than on opinion, and concludes that the guidelines as written can serve the profession throughout the decade.

Bibliography

Allen, Gillian. (1990, Fall). CD-ROM training: What do patrons want? *Reference Quarterly, 30* (1): 88-93.

Alberico, Ralph. (1990) AI/Expert systems: The library connection. In Nancy M. Nelson (Ed.). *Technology for the '90s: Microcomputers in libraries, research contributions from the 1989 computers in libraries conference* (pp. 65-95). Westport, CT: Meckler.

American Association of School Librarians and Association for Educational Communications and Technology. (1988). *Information power: Guidelines for school library media programs*. Chicago, IL: American Library Association; Washington, DC: Association for Educational Communications and Technology.

Auchstetter, Rosann M. (1990, May). The role of the rare book library in higher education: An outsider surveys the issue. *College & Research Libraries, 51* (3): 228.

Barnes, Robert. (1989). An ethics code for ASIS. In Jeffrey Katzer and Gregory B. Newby (Eds.). *Proceedings of the 52nd annual meeting of the American Society for Information Science. Managing information and technology* (p. 206, abstract). Medford, NJ: Learned Information.

Barron, Daniel. (1990, November). Revising the AASL/AECT guidelines. *School Library Journal, 36* (11): 49.

Basch, Reva (1990, March). Databank software for the 1990s and beyond—Part 1: The users' wish list. *Online, 14* (2): 17-24.

Bayer, Alan E., Smart, John C., & McLaughlin, Gerald W. (1990, July). Mapping intellectual structure of a scientific subfield through author cocitations. *Journal of the American Society for Information Science, 41* (5): 444-452.

Bishop, Ann P. (1990, November). *The National Research and Education Network (NREN): Promise of a new information environment. ERIC Digest* (EDO-IR-90-4). Syracuse, NY: ERIC Clearinghouse on Information Resources. (Available from the ERIC Clearinghouse on Information Resources, Syracuse University, 030 Huntington Hall, Syracuse, NY 13244-2340).

Bookstein, A. (1990, July). Informetric distributions, part 1: Unified overview. *Journal of the American Society for Information Science, 41* (5): 368-375.

Boss, Richard. (1990). Information technology. In Roger Parent (Ed.). *The ALA yearbook of library and information services* (p. 131-133). Chicago, IL: American Library Association.

Breivik, Patricia Senn & Wedgeworth, Robert (Eds.). (1988). *Libraries and the search for academic excellence.* Metuchen, NJ: Scarecrow Press.

Breivik, Patricia Senn & Gee, E. Gordon. (1989). *Information Literacy: Revolution in the Library.* New York: Macmillan Publishing Company.

Breivik, Patricia Senn & Shaw, Robert. (1989, Winter). Libraries prepare for an information age. *Educational Record 70* (1): 12-19.

Breivik, Patricia Senn (1989). Information literacy: Revolution in education. In Glenn E. Mensching & Teresa B. Mensching (Eds.). *Coping with information illiteracy: Bibliographic instruction for the information age.* Ann Arbor, MI: Pierian Press.

Breivik, Patricia Senn (1990). National forum on information literacy. In Roger Parent (Ed.). *The ALA yearbook of library and information services*, p. 209. Chicago, IL: American Library Association.

Brogan, Martha. (1990, May). Trends in international education: New imperatives in academic librarianship. *College & Research Libraries, 51* (3): 200.

Bruandet, Marie-France. (1989). Outline of a knowledge-base model for an intelligent information retrieval system. *Information Processing and Management 25* (1): 89-115.

Buerger, David. (1989, October 23). CD-ROM servers capitalize on LAN connectivity potential. *Infoworld, 11*(43): 41.

Carnow, Gary A. (1988, September/October). Model technology schools. *Media and Methods, 25* (1): 13-14.

Carrington, Bessie M. (1990, April) Expert systems: Power to the experts. *Database, 13*(2): 47-52.

Charles, Susan K. & Clark, Katherine E. (1990, July). Enhancing CD-ROM searches with online update: An examination of end user needs, strategies, and problems. *College and Research Libraries, 51*(4): 321-328.

Cheatham, Bertha M. (1989, December). A fight for rights: The year in review. *School Library Journal, 35* (16): 29-35.

Cherry, Joan M. & Clinton, Marshall. (1989). A profile of user background and user satisfaction with the University of Toronto online catalog—OPAC—and its implications for user training and user interfaces. In Jeffrey Katzer & Gregory B. Newby (Eds.). *Proceedings of the 52nd annual meeting of the American Society for Information Science. Managing information and technology* (p. 125). Medford, NJ: Learned Information.

Craver, Kathleen W. (1991, Winter). Bridging the gap: Library services for immigrant populations. *Journal of Youth Services in Libraries, 4* (2): 123-130.

Craver, Kathleen W. (1990). The instructional consultant role of the school library media specialist 1980-1989. In Jane Bandy Smith (Ed.). *School Library Media Annual, 8*: 4-14. Englewood, CO: Libraries Unlimited.

Curtis, Ruth V. (1990). The contributions of technology to instruction and learning. In Jane Bandy Smith (Ed.). *School Library Media Annual, 8:* 59-66. Englewood, CO: Libraries Unlimited.

Cutlip, Glen W. (1988). *Learning and information: Skills for the secondary classroom and library media program*. Englewood, CO: Libraries Unlimited.

Davies, Jim. (1987, June 16-17). *Artificial intelligence, expert systems, natural language interfaces, knowledge engineering and the librarian*. Paper presented at the Pacific Conference on New Information Technology for Library and Information Professionals (1st, Bangkok, Thailand). ED 318 428.

Devin, Robin B. & Kellogg, Martha. (1990, January). The serial/monograph ratio in research libraries: Budgeting in light of citation studies. *College & Research Libraries, 51* (1): 46-54.

Dewey, Barbara. (1989). The University of Iowa staffing utilization study: An activities-based approach. In Jeffrey Katzer & Gregory B. Newby (Eds.). *Proceedings of the 52nd annual meeting of the American Society for Information Science. Managing information and technology* (p. 48). Medford, NJ: Learned Information.

Dickman, Floyd C. (1990, Spring). Literacy, libraries and linking resources. *Reference Quarterly, 29* (3): 336-339.

Dowd, Frances Smardo. (1989, March-April). Serving latchkey children: Recommendations from librarians. *Public Libraries, 28* (2): 101-106. Cited in Feldman, Sari. (1990). *The library and the latchkey. ERIC Digest*. Syracuse, NY: ERIC Clearinghouse on Information Resources. ED number to be assigned.

Eisenberg, Michael B. & Berkowitz, Robert E. (1988). Curriculum initiative: An agenda and strategy for library media programs. Norwood, NJ: Ablex Publishing Corp.

Eisenberg, Michael B. & Berkowitz, Robert E. (1990). *Information problem-solving: The Big Six Skills approach to library & information skills instruction*. Norwood, NJ: Ablex Publishing Corp.

Eisenberg, Michael B., Trombly, Carolyn K., & Ruth, Lindsay D. (1988). *Trends and issues in library and information science*. Syracuse, NY: ERIC Clearinghouse on Information Resources. ED 314 099.

Ely, Donald P., Januszewski, Alan, & LeBlanc, Glenn. (1988). *Trends and Issues in Educational Technology 1988.* Syracuse, NY: ERIC Clearinghouse on Information Resources. ED 308 859.

Ely, Donald P. , LeBlanc, Glenn, & Yancey, Crystal. (1989). *Trends and Issues in Educational Technology 1989.* Syracuse, NY: ERIC Clearinghouse on Information Resources. ED 326 212.

Epler, Doris. (1989). *Online searching goes to school.* Phoenix, AZ: Oryx Press.

Feldman, Sari. (1990). *The library and the latchkey. ERIC Digest.* Syracuse, NY: ERIC Clearinghouse on Information Resources, 1990. ED number to be assigned.

Fenly, Charles & Harris, Howard. (1988). *Expert systems: Concepts and applications. Advances in Library Information Technology, Issue Number 1.* Washington, DC: Library of Congress. ED 310 770.

Flood, Barbara. (1989). Educating for ethics. In Jeffrey Katzer & Gregory B. Newby (Eds.). *Proceedings of the 52nd annual meeting of the American Society for Information Science. Managing information and technology* (p. 206, abstract). Medford, NJ: Learned Information.

Ford, Nigel. (1991, January). Knowledge-based information retrieval. *Journal of the American Society for Information Science, 42* (1):72-74.

Forsman, Rick B. (1990, July). Incorporating organizational values into the strategic planning process. *Journal of Academic Librarianship, 16* (3): 150-153.

Frankel, Mark S. (1989). Current issues in professional ethics. In Jeffrey Katzer and Gregory B. Newby (Eds.). *Proceedings of the 52nd annual meeting of the American Society for Information Science. Managing information and technology* (p. 206, abstract). Medford, NJ: Learned Information.

Freeman, Gretchen & Clement, Russell. (1989, April). Critical issues in library automation staff training. *The Electronic Library, 7* (2): 76-82.

Gay, L. S. & Croft, W. B. (1990). Interpreting nominal compounds for information retrieval. *Information Processing and Management, 26* (1): 21-38.

Grant, Marilyn A. & Stalker, John C. (1989, September). The multiplatter CD-ROM network at Boston College. *Laserdisk Professional, 2* (5): 12-18.

A guide to intellectual property protection. (1988, August). St. Paul, MN: Minnesota Small Business Assistance Office. ED 311 934.

Hales-Mabry, Celia. (1990). Serving the older adult. *The Reference Librarian, No. 32*, p. 69-76.

Herther, Nancy K. (1988, September). CD-ROM standards, networking and the future: A conversation with Meridian Data's Fred Meyer. *Laserdisk Professional, 1* (3): 41-49.

Hoffman, Gary M. (1990, February-March). A report of the International Piracy Project. *Bulletin of the American Society for Information Science, 16* (3): 9-11.

Huang, Samuel T. (1989). *The changing role of reference librarians in modern academic libraries*. Unpublished paper, Northern Illinois University. ED 313 047.

Hernon, Peter & McClure, Charles R. (1990). *Evaluation and library decision making*. Norwood, NJ: Ablex Publishing Corp.

Hopkins, Dianne McAfee. (1990, Summer). Factors influencing the outcome of library media center challenges at the secondary level. *School Library Media Quarterly, 18* (4): 229-244.

Huston, Mary M. (1989, Spring). May I introduce you: Teaching culturally diverse end-users through everyday information seeking experiences. *Reference Services Review, 17* (1): 7-11.

Immroth, Barbara. (1984, Winter). Technology and network participation. *Drexel Library Quarterly, 20* (1): 27-38.

Information power: Guidelines for school library media programs. (1988). Chicago, IL: American Library Association;

Washington, DC: Association for Educational Communications and Technology.

Johnson, Mary E. & Rosen, Barbara S. (1990, March). CD-ROM end user instruction: Planning model. *Laserdisk Professional, 3* (2):35-40.

Irving, Ann. (1988, February). School libraries: Fifty years ahead—are you ready yet? *School Librarian, 36* (1): 10-13.

Jones, Dorothy. (1989, Spring). Support staff and technology: Perceptions and opinions. *Library Trends, 37* (4): 432-456.

Judd, Jean. (1990, September 12-14). *The networking angle—Quince Orchard style.* Paper presented at the Conference of School Library Media Supervisors sponsored by the Division of Public Schools, Florida Department of Education, Tallahassee, FL.

Kirtz, Mary K. (Winter 1991). Let's Talk about It: A library program to enhance cultural literacy. *The CEA Forum 21* (1): 36.

Kreitz, Patricia A. & Ogden, Annegret. (1990, July). Job responsibilities and job satisfaction at the University of California libraries. *College & Research Libraries, 51* (4): 297-312.

Kuhlthau, Carol C. (1989a, Summer). The information search process of high-, middle-, and low-achieving high school seniors. *School Library Media Quarterly, 17* (4): 224-226.

Kuhlthau, Carol C. (1989b, Fall). Information search process: A summary of research and implications for school library media programs. *School Library Media Quarterly, 18* (1): 19-25.

Kulleseid, Eleanor R. (1989, May-June). Beyond survival to *Information Power. Illinois Libraries, 71* (5-6): 255-259.

Lavin, Richard J. & Phillepo, John. (1990, November). Improve school-based management through intelligent networking. *T.H.E. Journal (Technological Horizons in Education), 18* (4): 69-71.

Liddy, E. D. (1990). Anaphora in natural language processing and information retrieval. *Information Processing and Management, 26* (1): 39-52.

Liddy, E. D. (1987). Discourse-level structure in abstracts. In *Proceedings of the 50th Annual Meeting of the American Society for Information Science* (pp. 138-147). Medford, NJ: Learned Information.

Marshall, Joanne Gard. (1990, January-March). Diffusion of innovation theory and end-user searching. *Library & Information Science Research, 12* (1): 55-69.

Martin, Rebecca. (1990, January). The paradox of public service: Where do we draw the line? *College & Research Libraries 51* (1): 20-26.

McCain, Katherine W. (1990, July). Mapping authors in intellectual space: A technical overview. *Journal of the American Society for Information Science, 41* (5): 433-443.

Metzler, Douglas P., Haas, Stephanie W., Cosic, Cynthia L., & Weise, Charlotte A. (1990). Conjunction, ellipsis, and other discontinuous constituents in the Constituent Object Parser. *Information Processing and Management, 26* (1): 53-72.

Neuman, Delia. (1990, Spring). Beyond the chip: A model for fostering equity. *School Library Media Quarterly, 18* (3): 158-164.

Ormondroyd, Joan. (1988). *Course integrated library instruction. ERIC Digest* (EDO-IR-88-8). Syracuse, NY: ERIC Clearinghouse on Information Resources. ED 306 960.

Paice, Chris D. (1990). Constructing literature abstracts by computer: Techniques and prospects. *Information Processing and Management, 26* (1): 171-186.

Parkhurst, Carol (Ed.). (1990). *Library perspectives on NREN: The National Research and Education Network*. Chicago, IL: American Library Association.

Pastine, Maureen & Katz, Bill (Eds.). (1989). Integrating library use skills into the general education curriculum. *The Reference Librarian, 24*: 1-334.

Perritt, Patsy H. (1988, June-July). School library media certificate requirements: 1988 update, part I. *School Library Journal, 35* (9): 31-36.

Potter, William Gray. (1989, June). Expanding the online catalog. *Information Technology and Libraries, 8* (2): 99-104.

Puttapithakporn, Somporn. (1990, Winter). Interface design and user problems and errors: A case study of novice searchers. *RQ, 30* (2): 195-204.

Quezada, Shelley. (1990, November). Shaping national library literacy policy: A report from the Alexandria Forum. *Wilson Library Bulletin, 65* (3): 22-24, 158.

Richardson, John, Jr. (1989, March). Toward an expert system for reference service: A research agenda for the 1990s. *College & Research Libraries, 50* (2): 231-248.

Rosenberg, Jerry M. (1984). *Dictionary of computers, data processing, and telecommunications*. New York: John Wiley & Sons.

Royal, Selvin W. (1989, Fall). *Information Power*: Curriculum implications. *Journal of Education for Library and Information Science, 30* (2): 102-112.

Rousseau, Ronald. (1990, April). Relations between continuous versions of bibliometric laws. *Journal of the American Society for Information Science, 41* (3): 197-203.

Rutherford, John. (1990, September). Improving CD-ROM management through networking. *CD-ROM Professional, 3* (5): 20-27.

Salton, G., Buckley, C., and Smith, M. (1990). On the application of syntactic methodologies in automatic text analysis. *Information Processing and Management, 26* (1): 73-93.

Segal, JoAn S. (1990, Fall). Academic librarians in the twenty-first century—Myth or reality? *Georgia Librarian, 27* (3): 60-65.

Services to Children Committee, Public Library Association. (1988, May). *"Latchkey children" in the public library: A position paper*. Chicago: American Library Association.

Cited in Feldman, Sari. (1990). *The library and the latchkey. ERIC Digest*. ERIC Clearinghouse on Information Resources, 1990. ED number to be assigned.

Sievert, Mary Ellen C. (1990, December). Ten years of the literature of online searching: An analysis of *Online* and *Online Review*. *Journal of the American Society for Information Science, 41*(8): 560-568.

Smeaton, A. F. (1990). Natural language processing and information retrieval. *Information Processing and Management, 26* (1): 19-20.

Smith, Carolyn. (1990, January). Networking in Illinois: Greater than the sum of its parts. *Illinois Libraries, 72* (1): 83-85.

Statewide Automation Committee, Dinah Lindauer, Chair. (1989). *Technology & access: The electronic doorway library*. Albany, NY: New York State Library.

Steffey, Ramona J. & Meyer, Nikki. (1989, September). Evaluating user success and satisfaction with CD-ROM. *Laserdisk Professional, 2* (5): 35-45.

Stripling, Barbara K. (1989, Spring). Rethinking the school library: A practitioner's perspective. *School Library Media Quarterly, 17* (3): 136-139.

Stripling, Barbara K. & Pitts, Judy M. (1988). *Brainstorms and blueprints: Teaching library research as a thinking process*. Englewood, CO: Libraries Unlimited.

Sullivan, Michael, Borgman, Christine, & Wippern, Dorothy. (1990). End-users, mediated searches, and front-end assistance programs on Dialog: A comparison of learning, performance, and satisfaction. *Journal of the American Society for Information Science, 41* (1): 28.

Swisher, Robert, Spitzer, Kathleen L., Spriestersbach, Barbara, Markus, Tim, & Burris, Jerry. (1991, Spring). Telecommunications for school library media programs. *School Library Media Quarterly, 19* (3): 153-160.

Talan, Carole (1990, November). Family literacy: Libraries doing what libraries do best. *Wilson Library Bulletin, 65* (3): 30-32, 158.

Tubesing, Richard. (1989). *Library collections development and maintenance policies and procedures manual.* Hobbs, NM: Southwest College, Scarborough Memorial Library. ED 309 782.

Turner, Philip M. & Zsiray, Stephen W., Jr. (1990). The consulting role of the school library media specialist: A review of the literature. In Blanche Woolls (Ed.). *The research of school library media centers. Papers of Treasure Mountain Research Retreat, Park City, Utah, October 17-18, 1989* (pp. 1-20). Castle Rock, CO: Hi-Willow Research and Publishing Co.

U.S. Census. (1991, March 26). Telephone call. Data from tapes; not yet published.

Van House, Nancy A. (1989, Fall). Output measures in libraries. *Library Trends, 38* (2): 268-279.

Wall, Celia, Haney, Roger & Griffin, John. (1990, May). Hard copy versus online services: Results of a survey. *College & Research Libraries, 51* (3): 267-276.

Weaver-Meyers, Pat. (1990, May). ARL libraries and staff development: A suggested model for success. *College & Research Libraries, 51* (3): 253.

What is an expert system? (July 1989). *Library Systems Newsletter* (published by Library Technology Reports, ALA), *9* (7): 51-53.

Wisconsin State Department of Public Instruction. (1989). *Matrix for curriculum planning in library media and information skills education. Bulletin no. 9288.* Madison, WI: Author. ED 308 870.

Young, Heartsill. (Ed.). (1983). *The ALA glossary of library and information science.* Chicago, IL: American Library Association.

Appendix A: Content Analysis Methodology Used in This Study

Michael B. Eisenberg

Purpose

The Educational Resources Information Center (ERIC) is periodically charged with synthesizing the literature of various academic disciplines and other areas that contribute to the field of education. The purpose of this publication is to provide some indication as to where the field of library and information science is going.

The identification of emerging trends and issues is a first step in this endeavor. The ERIC Clearinghouse on Information Resources specializes in the areas of educational technology and library/information science. In order to determine and document trends in each of these areas, the authors formally analyzed one-year samples of the literature from each area. The 1988 survey of library and information science literature is reported in Eisenberg, Trombly, and Ruth (1988, IR-81). Parallel surveys of educational technology literature are reported in Ely, Januszewski, and LeBlanc (1988, IR-82) and Ely, LeBlanc, and Yancey (1989, IR-86).

The trends and issues reported in this current monograph are derived from a sample of the literature analyzed from only a single-year period (October 1989-September 1990). As before, the methodology seeks to identify emerging trends through reviewing a large number of documents in a reasonably short period of time. The one year time period is

one way of accomplishing this. The authors acknowledge that this limits the verification of trends over a long period of time. Still, clearly discernable patterns do emerge from the literature. In addition, the Eisenberg 1988 study serves as a reference point, and similarities and differences between the 1988 and current surveys are noted.

Content Analysis: Some Background

A form of content analysis is used in this study to determine the emerging trends and issues relevant to library and information science. A trend is considered to be a cumulative indicator of activities or products that show direction. An issue is considered to be a problem or a question for which there are multiple points of view. It is important to note that a trend may be considered by some to be an issue. As a problem or question develops within an academic field, it may be considered an issue. The distinction between these two concepts is not as clear as one might like it to be.

Content analysis is intended to be a method for the objective and systematic collection of pre-specified data for the purpose of identifying the special characteristics of those data (Carney, 1972). It is a broad concept that can be used in any attempt to practice research or science. Whenever symbolic action or communication is the subject of investigation, the analysis of content is involved (Janowitz, 1976).

Not all content analysis is the same: there are both quantitative and qualitative strains of content analysis. A common form of the qualitative type of content analysis is conceptual analysis, i.e., the investigation of the use and meaning of particular words. A common type of quantitative content analysis is the measurement of the length of articles that deal with a predetermined topic. A tabulation of the results of either of these forms of content analysis is required in order to make any inferences about trends. Examples of the use of content analysis as a methodology have appeared in both the popular and the academic press. John Naisbett's *Megatrends* (1982) identified ten trends that he thinks will become influential in our lives. Morris Janowitz (1976) outlines the application of content analysis to determine sociopolitical trends from a sampling of our nation's newspapers.

Reviews of the advantages, limitations, and features of content analysis can be found in Carney (1972), Hosti (1969), and Janowitz (1976).

Content Analysis in This Study

The professional literature of a field indicates the concerns, inquiries, and research that are important to that field. Such is the case with the literature of library and information science. It was decided that a review of the professional literature of library and information science would reveal the ideas that were of importance to the field. Through this process it was hoped that indications could be derived about the direction (emerging trends and issues) of the field. The basic idea behind this study was that if one could classify and tabulate pre-selected writings based on interpretations of the authors' purpose it would be possible to indicate current directions in the field.

In order to achieve this end, it was determined that a substantial number of source items would have to be reviewed. Because this study was primarily concerned with the number of times that a topic was discussed (as opposed to the length of the discussion or the particular use of the concepts involved in the discussion), and given the resource constraints (limited time and manpower), it was decided that a content analysis would be the appropriate data collection technique, but that a hybrid form of content analysis would have to be developed for the purpose of this study.

It was imperative that the data collection teams be able to review and classify sources efficiently and effectively, while avoiding the pitfall of playing fast and loose with the data. The general steps in this study are outlined as follows:

- The conceptualization of the recording units and categories.
- The determination of the sources to be reviewed.
- The specification of the data collection procedures.
- The analysis of the data.

It is reasonable to state that the vast majority of content analyses that are concerned with determining trends must somehow address these steps. However, these particular

tasks do not always occur in the order in which they were performed in this study. A reordering of tasks can be the difference between inductive and deductive studies. In this study we use a deductive methodology. Because of the nature of the content that is specific to each field in trends research, there is no one right way to do content trends analysis. Hence, by necessity, it is a hybrid methodology. It is important to acknowledge that each type of content analysis has its own advantages.

Conceptual Categories into Operational Definitions

The general content categories that were used in this study were based on the concept of the functions performed by media personnel discussed by Chisholm and Ely in 1976. This conceptual scheme is similar to divisions used by Prostano and Prostano (1987) and *Information Power* and older standards, and is thus indicative of the field of library and information science: **Personnel, Management, The Field, Instructional Processes, Information Services, Technical Developments,** and **Research and Theory**. The content categories were determined before the study began rather than during the review of the data sources. In this sense the categories were imposed upon the study rather than generated in a more inductive fashion. This conscious decision was based on the need for efficiency in the data collection process. After the general content categories had been identified, subcategories were specified. Some were added later during the data collection process. The specification of these components was based on a thorough knowledge of the literature and extensive experience in professional practice. An example of one of the conceptual categories is the function of management. The broad concept of **management** was operationalized by specifying the following tasks: *organization, logistics/operations, procedures/policies, facilities, finance/budget,* and *planning processes.* Changes in subtopics from 1988 include dividing *computer-related* into "computer-based information sources," "computer-related (hardware/software)," and "artificial intelligence"; creating two new subtopics under **management**—*personnel* and *preservation*; and adding *information retrieval* under **research**.

Two instruments had to be created for this study. The primary instrument allowed reviewers to record both the source of the data and the category into which the source had been classified (see Appendix B). The second instrument served as a tally and comment sheet for each item collected and classified on the primary instrument (see Appendix C).

Content Source Units

Journal articles, dissertation abstracts, ERIC documents, and professional conference programs were chosen as the content units because they provide a current record of issues and topics that leaders in the field of library and information science have acknowledged to be important.

The analysis of the content in professional journal articles and dissertation abstracts is not new to research in the area of library and information science. For example, Feehan and colleagues (1987) reviewed issues and trends in library and information science research published in 91 English-language journals in 1984. Categories of analysis included broad subject areas and subdivisions of applied subject categories, library types, and research methods. Houser (1988) was interested in the concept of information science. He analyzed the content of the *Journal of the American Society for Information Science* from 1970-1984 to examine the nature of information science, its relation to library service, whether information science is a new branch of science, and whether a community of information science researchers exists.

All sources of analysis were the same as those identified for the 1988 study. The selection of journals was based on a published study of perceived prestige of core journals in library science (Kohl & Davis, 1985) and recommendations from three faculty members at the School of Information Studies at Syracuse University. They are: *College & Research Libraries, School Library Media Quarterly, The Journal of the American Society for Information Science, Library and Information Science Research,* and *Library Trends.*

The dissertations included in this study were produced at the universities identified by White's study (1987) as schools whose faculties are perceived as contributing sig-

nificantly to the advancement of the profession through research, publication, and leadership. The University of Illinois at Urbana-Champaign, the University of California at Los Angeles, the University of California at Berkeley, the University of North Carolina at Chapel Hill, and Indiana University were ranked as the top five by library educators, and were among the top six in rankings by academic research library administrators. While Bookstein and Biggs (1987) point out the problems of such rankings, their study also listed these schools as highly ranked.

Conference programs and ERIC documents were added to this particular study in order to broaden the scope of the content to be analyzed. It appeared that conference programs would reveal the latest developments in the field of library and information science because conference presentations usually discuss the most recent findings of current research and development efforts. Two professional conference programs were examined, i.e., the American Library Association (ALA) and the American Society for Information Science (ASIS). ALA and ASIS are the two national organizations most directly encompassing the field.

ERIC documents were included in the scope of this inquiry since the materials entered in the ERIC database represent a cross-section of the contemporary literature of library and information science. Following the basic premise of Webb *et al.* (1966), the research team believed that a multiple operational approach should be emulated. The members of the team felt that they could have an increased level of confidence in their analysis if they increased the scope and breadth of the data included in the study.

Data Collection Procedures

The data classification and tabulation instruments were tested for their functionality. This was done by asking prospective data collectors to use the instrument to review the same three articles from one professional journal. Particular attention was paid to the conceptual clarity of the content areas, and efforts were made to identify ambiguities and confusing elements within the instruments that might mislead the data collectors into generating erroneous classifications. The graphic design of the instruments was

checked to insure the efficiency and the effectiveness of the data recording process.

A training session was held for the three data collectors, who were all graduate students at Syracuse University. This session was designed to teach them how to:

- Identify the purpose of an article by reading the introduction, abstract and concluding statement.
- Use the data source and classification instrument.
- Use the tabulation and comment instrument.
- Locate the data sources.

The ability of the data collectors to meet these four objectives was demonstrated by a test for inter-rater reliability. After a period of one week the data collectors met and compared the results of their interpretations of the articles from three different professional journals. Correlations were as high (Pearson r slightly exceeding 0.8) as in the 1988 study. To insure further reliability, it was decided that each data collector would designate two possible categories for each of the journal articles, a primary choice and a secondary choice. The employment of this technique virtually eliminated cases of non-agreement among the data collectors. Inter-rater reliability was virtually assured as collation of results was done in a group session that included the research director. In this session, data collectors discussed those cases where they had disagreed until an agreement could be reached.

At the conclusion of the data source recording and classification phase of the study, the data collectors tabulated the results. They reported the results of all of the dissertations on one tabulation instrument for analysis. Each of the five professional journals, the two conference programs, the *ALA Annual*, and the monthly entries in the ERIC index, *Resources in Education* (RIE), were each recorded separately. This style of reporting allowed for cross-source analysis.

In writing this monograph, the authors also used reports, articles, position papers, and personal observations from professional participation in national and international events to provide further input, clarification, and explanation of trends and issues.

Limitations to the Study

There are a number of limitations to this study. First, as a form of content analysis, the study is a hybrid. It does not enjoy the advantages of conceptual analysis, i.e., the inquiry into the use and meaning of particular terms that have a bearing on the field of library and information science. Second, it has no quantitative base other than that of tabulation. The methodology did not reveal the depth of the particular content that was used or analyzed in the sources. Third, the decision to use sources that have no precedent in content analysis (e.g., conference proceedings) raises questions about the data sources that were used in the study. Fourth, there is the possibility that certain items that were reviewed as source data were specialty items. Special issues of a particular journal or a conference dedicated to a particular theme could skew the results of a study. Fifth, it is difficult to make statements about trends based on the data gathered in a single year since there is no earlier referent. Finally, the attempt to emulate the multiple operational model of analysis was not a true one. Since multiple operationalism is an attempt to bring several different methodologies to bear on a particular question or concern, this study could be considered to be a cross-methodological meta-analysis. Although attention was given to increasing and varying the number and types of data sources used to analyze trends and issues in the field of library and information science, the study used a single methodology.

Strengths of the Study

The overall value of this study lies in its identification and explanation of key trends and issues in library and information science. Specific strengths are similar to those noted in Ely *et al.* (1989, p. 45-50):

- the extension of the work of the earlier study.
- the identification of "cutting edge" topics through conference presentations, dissertations, and ERIC input.
- the further refinement of the methodology.
- the trends and issues themselves.

Recommendations for the Future

This study had three goals. The first was to provide an indication of the emerging trends and issues in the field of library and information science. The difficulty of recognizing trends based on data gathered from a relatively short time span has already been mentioned. But certainly the number and variety of sources utilized make the analysis provided here more than an educated guess. The second goal of this study was to add to baseline data provided in the 1988 study so that trends in the field of library and information science can be more easily recognized in the future. It is much easier to have confidence in having met this second goal. For example, the data gathered and conclusions drawn from the 1988 study were highly useful in considering the new data. Together, the two studies provide a tabulation of the professional discussions about what comprised the field of library and information science in 1987-90. The third goal of this study was to refine the methodology. The instruments were refined, and data sources reconsidered. Most encouraging was the ability of a new team of researchers to use the methodology in an efficient and effective manner.

References

Bookstein, Abraham & Biggs, Mary. (1987, October). Rating higher education programs: The case of the 1986 White survey. *The Library Quarterly, 57* (4): 351-399.

Carney, T.F. (1972). *Content analysis: A technique for systematic inference from communication*. Winnipeg: University of Manitoba Press.

Chisholm, M. E. & Ely, D. P. (1976). *Media personnel in education: A competency approach*. Englewood Cliffs, NJ: Prentice-Hall.

Feehan, Patricia E., Gragg, W. Lee II, Havener, Michael & Kester, Diane D. (1987, July-September). Library and information science research: An analysis of the 1984 journal literature. *Library and Information Science Research, 9* (3): 173-185.

Washington, DC: Association for Educational Communications and Technology.

Janowitz, M. (1976). Content analysis and the study of sociopolitical change. *Journal of Communication, 26* (4): 10-21.

Kohl, David F. & Davis, Charles H. (1985, January). Ratings of journals by ARL library directors and deans of library and information science schools. *College & Research Libraries, 46* (1): 40-47.

Naisbett, John. (1982). *Megatrends: Ten new directions transforming our lives*. New York: Warner Books.

Prostano, E. T. & Prostano, J. S. (1987). *The school library media center*. Littleton, CO: Libraries Unlimited.

Webb, E.J., Campbell, D.T., Schwartz, R.D., & Sechrest, L. (1966). *Unobtrusive measures: Nonreactive research in the social sciences*. Chicago: Rand McNally.

White, Herbert S. (1987, July). Perceptions by educators and administrators of the ranking of library school programs: An update and analysis. *The Library Quarterly, 57* (3): 252-268.

Source: _____ Date: _____ Reviewer: _____

#	Title	Category 1	Category 2	Comments	IT in Schools
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Appendix C

TALLY SHEET: TRENDS AND ISSUES STUDY		Document Name:
TRENDS	**TALLY**	**COMMENTS**
THE FIELD		
History		
Status		
Future		
Ethics		
Legal Aspects		
The Standards		
PERSONNEL		
Roles/Responsibilities		
Recognition		
Certification		
Leadership		
Professional Education		
MANAGEMENT		
Organization		
Logistics/Operations		
Procedures/Policies		
Facilities		
Finance/Budget		
Planning Processes		
Collection Management		
Preservation		
TECHNOLOGICAL DEV.		
Computer-Related (Hard/Soft)		
Computer-Based Info Sources		
Telecomm./Networks		
Video		
Audio		
Photography		
Interactive Media		
Hypermedia		
Artifical Intelligence		
INSTRUCTIONAL PROCESSES		
Distance Education		
Problem Solving		
Evaluation		
Design and Development		
SERVICES		
Literature/Reading Guidance		
Resources (Curr) Support		
Skills Instruction		
Information Services		
RESEARCH/THEORY		

Left to right—Kathleen L. Spitzer, Christine Darby, Michael B. Eisenberg, and Ilana Kingsley

Michael B. Eisenberg is an Associate Professor at the School of Information Studies, Syracuse University, and Director of the ERIC Clearinghouse on Information Resources. The unifying aspect of Mike's diverse teaching and research activities is the ongoing effort to improve society's ability to meet people's information needs. Mike strives to accomplish this through educating information professionals, conducting research, writing and presenting on the use of information and information technology in education and training; information problem-solving and development of essential information skills; the measurement and evaluation of information systems; and the curriculum concerns and management of library media programs.

Kathleen L. Spitzer is a recent graduate of the Syracuse University, School of Information Studies Master's of Library Science program, specializing in school media studies. She is currently employed as a library and information consultant, authoring articles on information skills and information technology and presenting on information skills to school library media and parent audiences.

Ilana Kingsley is a candidate in the Master's of Library Science program at the School of Information Studies, Syracuse University. She is a 1988 graduate of the State University of New York College at Oneonta with a B.A. degree in English. Her primary interests are virtual reality and wilderness education.

Christine Darby is a candidate in the Master's of Library Science program at the School of Information Studies, Syracuse University. She is a 1989 graduate of the State University of New York College at Oswego with a B.A. degree in history. Her interests include the instruction of information users and research related to information use and networking.

BEST COPY AVAILABLE